REMARKS

This Amendment, Response, and Request for Continued Examination Pursuant to 37 CFR 1.114 is being submitted in response to the Advisory Action mailed February 7, 2006, and the final Office mailed November 10, 2005.

Examiner indicates that the previous request for reconsideration has been considered, but does not place the Application in condition for allowance, stating that the proposed amendment will not be entered because it would add limitations to the claims that were not previously presented and therefore raise new issues that would require further consideration and search. Examiner has maintained the rejections of the Final Office Action.

Claims 1-35 are pending in the Application. Claim 28 stands rejected under 35 U.S.C. 102(e) as being anticipated by Cardwell et al. (U.S. Patent Application Publication No. 2002/0036988). Claims 29-31 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Ramamurthy et al. ("Optimizing Amplifier Placements in a Multiwavelength Optical LAN/MAN: The Unequally Powered Wavelengths Case," IEEE/ACM Transactions on Networking, Vol. 6, No. 6, December 1998, pp. 755-767). Claims 1-3, 7-10, 14, 32, and 34 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. (U.S. Patent No. 6,304,347). Claim 33 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. as applied to Claim 32, and further in view of Sharma et al. (U.S. Patent No. 6,046,833). Claims 4-6, 11-13, and 35 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. as applied to Claims 1, 8, and 32, and further in view of Ramamurthy et al. Finally, Claims 15-27 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. and Ramamurthy et al.

In response to these rejections, Claims 1, 8, 15, 28, 29, and 32 have been amended to further clarify the subject matter which Applicant regards as the invention, without prejudice or disclaimer to continued examination on the merits. These amendments are fully supported in the Specification, Drawings, and Claims of the Application and no new matter has been added. Based upon the amendments, reconsideration of the Application is respectfully requested in view of the following remarks.

Rejection of Claim 28 Under 35 U.S.C. 102(e) – Cardwell et al.:

Claim 28 stands rejected under 35 U.S.C. 102(e) as being anticipated by Cardwell et al. (U.S. Patent Application Publication No. 2002/0036988).

With regard to Claims 1-13 and 28, and Cardwell et al., Examiner states "it is noted that ... features upon which Applicant relies (i.e., further specific details of any particular algorithm for determining amplifier placement) are not recited in the rejected claim(s)."[1] Likewise, with regard to Claims 15-27 and 29-35, and Cardwell et al., Examiner states "the claims have been amended to recite that the selection is constrained by 'one or more' of several types of algorithms recited. However, ... Cardwell et al. do disclose a selection constrained by one of the recited algorithms, specifically a span loss algorithm wherein it is determined if a given span has an internal span loss for one or more channels that exceeds a predetermined level (page 7, paragraph [0076])."[2]

Claim 28, as well as Claims 1, 8, 15, 29, and 32, have been amended to recite, in relevant part (Claims 1, 8, 15, 29, and 32 incorporating substantially similar language):

> wherein the initial placement is constrained by one or more of a node loss algorithm wherein it is determined if a given node has an internal node loss for one or more channels that exceeds a predetermined level, ***a span loss algorithm wherein it is determined if a given span has an internal span loss for one or more channels that exceeds a predetermined level,***

[1] Office Action, p. 17.
[2] Office Action, p. 18.

> ***the span loss algorithm taking into account the internal span loss of a given fiber and one or more transmitter/receiver to output port/input port equivalent losses at one or more end nodes of the span***, an aggregate loss algorithm wherein it is determined if one or more nodes have an aggregate span and band loss for one or more channels that exceeds a predetermined level, and a sequential path search algorithm wherein the power characteristics of one or more channels are analyzed from add point to drop point;

thereby providing further specific details related to the span loss algorithm recited, and distinguishing it from the span loss algorithm which Cardwell et al. recite. These amendments are fully supported at pages 17-18, paragraph [0062], of the Application.

Assuming, arguendo, that Cardwell et al. disclose a span loss algorithm, as suggested by Examiner, the nature of this span loss algorithm is detailed at page 7, paragraph [0076], which recites:

> Routine 116 tracks loss and amplifier noise during ring simulation in order to place the proper equipment in the correct location. Loss in an optical system occurs due to the length of fiber traversed, or the inclusion of splices in the fiber path. Routine 116 (as well as routine 112) models the loss for traversing a length of fiber as the loss per kilometer of fiber multiplied by the length of the fiber. ***Routine 116 (and 112) also models the effect of splices by including a loss per office for each office or node 12 traversed without a multiplexer. Thus a "through" office or node 12 will add to the signal loss***. Users set the loss parameters through input data. When costing a ring, routine 116 (or 112) calculates the signal loss for each link between add/drop multiplexers on the ring. If the loss thus calculated exceeds the loss allowed by the multiplexer, routine 112 will insert a regenerator (in the case of SONET/SDH) or routine 116 will insert an amplifier (in the case of DWDM) at the last office or node before the loss budget was exceeded. Thus, the method as depicted in FIG. 5 always puts regenerators and amplifiers at actual offices so the resulting equipment placement is realizable. If it is not possible to place regenerators or amplifiers so that the constraints are met, routines 112 and 116 will assign an infinite cost to the respective ring and the ring will not be selected.

Thus, the span loss algorithm of Cardwell et al. takes into account only the internal span loss of a given fiber and the through node losses along the span, and not the

internal span loss of the given fiber and one or more transmitter/receiver to output port/input port equivalent losses at one or more end nodes of the span, as recited in amended Claims 1, 8, 15, 28, 29, and 32. Additionally, in the present invention, the span loss algorithm may be extended to include non-adjacent nodes.

Furthermore, Cardwell et al. do not disclose a node loss algorithm, a path loss algorithm, an aggregate loss algorithm, or a sequential path algorithm. Additionally, Cardwell et al. do not disclose the combination of any one or more of these algorithms and a span loss algorithm, as does the present invention. For example, as stated in the Specification of the present invention, in Paragraph [0059] "the node loss algorithm may be combined with other algorithms described below; in Paragraph [0068], "[t]he span loss algorithm, alone, or in combination with the node loss algorithm, may be sufficient to substantially reduce the initial search space"; and in Paragraph [0070], "[t]he span loss algorithm may be extended to include non-adjacent nodes" with the path loss algorithm.

Therefore, Applicant submits that, because Claim 28 now recites elements/limitations not disclosed by Cardwell et al., the rejection of Claim 28 under 35 U.S.C. 102(e) as being anticipated by Cardwell et al. has now been overcome and respectfully requests that this rejection be withdrawn.

For the sake of emphasis, Applicant again submits that there are other distinct and patentable differences between the systems and methods of the present invention and those of Cardwell et al. Cardwell et al. disclose systems and methods for designing ring structures in a telecommunications network by generating or selecting cycles of network nodes and links, choosing at which nodes to place what types of equipment, and assigning demand over that set of nodes, links and equipment. See page 5, paragraph [0054]. Cost comparisons are then performed. See page 6, paragraph [0064]. These processes are basically carried out by trial-and-error alone, with only simple design parameters and constraints considered initially. See page 5, paragraphs [0056] and [0058]; page 6, paragraph [0061]. For example, these design parameters and constraints

may include frame and installation, signal sources, regeneration loss thresholds, losses before amplification, maximum ring circumference, maximum and minimum numbers of add/drop multiplexers on a ring, fiber material, sheath installation, structure expansion, costs, etc. The processes are iterative and involve the consideration of demand between nodes alone, in order of the magnitude of demand. See page 6, paragraphs [0063] and [0064].

The present invention, on the other hand, discloses a more refined two-step approach in which an *initial* placement of optical amplifiers in an optical network is determined using an optical power criterion, *subsequent* placements consistent with this initial placement are then selected, and quality of service means are used to analyze the quality of service of each of these subsequent placements.

Again, the optical power criterion used to determine the initial placement of optical amplifiers of these claims is also robust and novel, comprising one or more of a node loss algorithm wherein it is determined if a given node has an internal node loss for one or more channels that exceeds a predetermined level, a span loss algorithm wherein it is determined if a given span has an internal span loss for one or more channels that exceeds a predetermined level, the span loss algorithm taking into account the internal span loss of a given fiber and one or more transmitter/receiver to output port/input port equivalent losses at one or more end nodes of the span, an aggregate loss algorithm wherein it is determined if one or more nodes have an aggregate span and band loss for one or more channels that exceeds a predetermined level, and a sequential path search algorithm wherein the power characteristics of one or more channels are analyzed from add point to drop point.

The novelty and patentability of the systems and methods of the present invention are supported by their superior performance. By choosing an initial point using informed constraints and then iterating around this point, the time required to analyze a number of amplifier configurations is reduced from 697 years for an OC-48 analysis or 60,730 years

for an OC-192 analysis of 10 nodes, representing approximately 1.1 trillion amplifier configurations, to a matter of hours, as the systems and methods of the present invention select and test only likely candidates. See Application, pages 26-27.

Therefore, Applicant again submits that the rejection of Claim 28 under 35 U.S.C. 103 (a) as being anticipated by Cardwell et al. has now been traversed and respectfully requests that this rejection be withdrawn.

Rejection of Claims 29-31 Under 35 U.S.C. 103(a) – Cardwell et al. and Ramamurthy et al.:

Claims 29-31 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Ramamurthy et al. ("Optimizing Amplifier Placements in a Multiwavelength Optical LAN/MAN: The Unequally Powered Wavelengths Case," IEEE/ACM Transactions on Networking, Vol. 6, No. 6, December 1998, pp. 755-767).

The above arguments with regard to Claim 28 apply with equal force here. Therefore, Applicant submits that the rejection of Claims 29-31 under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Ramamurthy et al. has now been traversed and respectfully requests that this rejection be withdrawn.

Rejection of Claims 1-3, 7-10, 14, 32, and 34 Under 35 U.S.C. 103(a) – Cardwell et al. and Beine et al.:

Claims 1-3, 7-10, 14, 32, and 34 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. (U.S. Patent No. 6,304,347).

The above arguments with regard to Claim 28 apply with equal force here. Therefore, Applicant submits that the rejection of Claims 1-3, 7-10, 14, 32, and 34 under

35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. has now been traversed and respectfully requests that this rejection be withdrawn.

Rejection of Claim 33 Under 35 U.S.C. 103(a) – Cardwell et al. and Sharma et al.:

Claim 33 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. as applied to Claim 32, and further in view of Sharma et al. (U.S. Patent No. 6,046,833).

The above arguments with regard to Claim 28 apply with equal force here. Therefore, Applicant submits that the rejection of Claim 33 under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. as applied to Claim 32, and further in view of Sharma et al., has now been traversed and respectfully requests that this rejection be withdrawn.

Rejection of Claims 4-6, 11-13, and 35 Under 35 U.S.C. 103(a) – Cardwell et al., Beine et al., and Ramamurthy et al.:

Claims 4-6, 11-13, and 35 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. as applied to Claims 1, 8, and 32, and further in view of Ramamurthy et al.

The above arguments with regard to Claim 28 apply with equal force here. Therefore, Applicant submits that the rejection of Claims 4-6, 11-13, and 35 under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. as applied to Claims 1, 8, and 32, and further in view of Ramamurthy et al., has now been traversed and respectfully requests that this rejection be withdrawn.

Rejection of Claims 15-27 Under 35 U.S.C. 103(a) – Cardwell et al., Beine et al., and Ramamurthy et al.:

Finally, Claims 15-27 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. and Ramamurthy et al.

The above arguments with regard to Claim 28 apply with equal force here. Therefore, Applicant submits that the rejection of Claims 15-27 under 35 U.S.C. 103(a) as being unpatentable over Cardwell et al. in view of Beine et al. and Ramamurthy et al. has now been traversed and respectfully requests that this rejection be withdrawn.

CONCLUSION

Applicant would like to thank Examiner for the attention and consideration accorded the present Application. Should Examiner determine that any further action is necessary to place the Application in condition for allowance, Examiner is encouraged to contact undersigned Counsel at the telephone number, facsimile number, address, or email address provided below. It is not believed that any fees for additional claims, extensions of time, or the like are required beyond those that may otherwise be indicated in the documents accompanying this paper. However, if such additional fees are required, Examiner is encouraged to notify undersigned Counsel at Examiner's earliest convenience.

Respectfully submitted,

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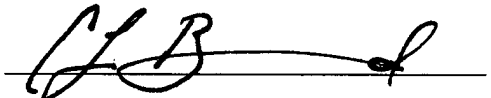

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